

Movement at PF: Evidence from Chinese Relativization*

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There are two main proposals for the analysis of relative clauses: the matching analysis (Chomsky 1977), on the one hand, and the promotion analysis (Vergnaud 1974; Kayne 1994), on the other. These two views differ in two important respects: structure and head movement. Structurally, the traditional view about relative clauses is that they are CP adjoined to NP (Chomsky 1977). On the other hand, going back to an earlier proposal made by Vergnaud (1974), Kayne (1994) argues instead that a relative clause is the complement of the determiner head (D) of DP. In terms of head movement, the traditional view is that the head NP is base-generated (the matching analysis), whereas, according to the promotion analysis, the head NP is raised from inside the relative clause.

Backed by several empirical and theoretical arguments, Aoun and Li (2003) have recently put forward the hypothesis according to which Chinese relative clauses fit the adjunction analysis better. On their view, the CP in Chinese relative clauses is not a complement of D, but is adjoined to NP, except that it is adjoined to the *left* of the NP (whereas the analysis for English was that the CP is adjoined to the *right* of the NP). The aim of this paper is to show that the complementation hypothesis is in fact correct for Chinese. My argument is built on the basic observation that, apart from Chinese relative clauses, Chinese is a head-initial language. Under the complementation analysis, relative clauses are thus head-initial in line with other phrase categories in Chinese. If the adjunction analysis were adopted, relative clauses will be the only head-final phrase category in Chinese: not an elegant or desirable result.

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One of the major challenges faced by the complementation analysis, however, is the treatment of the element *de*. Previous studies have argued that *de* is a complementizer (Huang 1982, Cheng, 1986). Yet, this assumption is not possible according to Kayne's approach. Like Simpson (2002), I argue that *de* is a determiner, albeit of a special kind. More specifically, I put forward the hypothesis that: (i) *de* is a non-referential determiner; (ii) *de* is a phrasal affix element that lowers to the first relevant XP it finds via a process of Local Dislocation, a special movement operation at the Syntax-Phonology interface (Embick & Noyer 2001). The head-last ordering for Chinese RCs is thus just an illusion: it is triggered by the special nature of *de* which encodes as part of its lexical make-up a [+affix] feature.

This paper is organized as follows. I begin with a summary of previous analyses of relative clauses in the literature. In Section 2, I propose a complementation analysis following Kayne (1994), arguing the availability of a non-referential determiner and the derivation at PF. Finally, I conclude in Section 3.

1. Previous Analyses of Relative Clauses

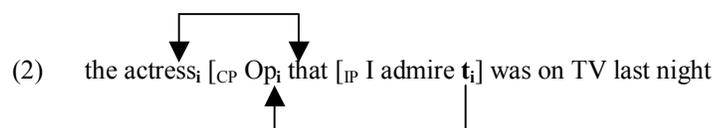
In this section, I will discuss the arguments in the literature for the matching analysis on the one hand, and for the promotion analysis, on the other. The arguments are discussed in terms of the movement and in terms of the structural make-up of relative clauses.

The evidence supporting the promotion analysis is the observation that the head can (sometimes) be interpreted inside the relative clause, yielding reconstruction effects. This supports the view that the head is derived via movement. Reconstruction effects can be observed in terms of idiom chunks, binding properties and scope possibilities. Taking Schachter's (1973) example cited by Aoun and Li (2003), an idiom chunk, such as 'make headway' (that cannot normally be separated) is allowed to be split in a relative construction such as (1)(1). In this example, the head nominal 'headway' is part of the external DP while 'made' is the predicate inside of the CP (to make headway).

- (1) The **headway** that Mel **made** was impressive.

(Aoun & Li 2003: 98)

In the matching analysis, however, Chomsky (1977) suggests that the derivation of relative clauses is similar to *wh*-interrogatives. Relative clauses are treated as CPs adjoined to the head noun it modifies, with an operator element raised from inside the relative clause to the specifier CP position. This element can be overt such as a relative pronoun, or non-overt. Moreover, the head is base-generated, and there is a matching relation between the null operator or the relative pronoun and the head as shown in (2).



An example showing that nominals do not reconstruct in relative clauses (thus the matching analysis) is given by McCawley (1981). The idiom chunk ‘the strings’ in (3) is related to the main clause verb ‘pull’ (the idiom: pull the string). Therefore, ‘the strings’ is not raised from inside the relative clause.

- (3) John **pulled the strings** that got Bill the job.

(cited from McCawley 1981 by Aoun & Li 2003: 107)

In sum, the matching analysis is based on the assumption that reconstruction of the head is not available and the relative clause is an adjunct adjoined to the head. However, in the promotion analysis, reconstruction effects are taken to be strong evidence in favour of the head movement analysis.

In addition to their contrastive treatments of the relative head, the promotion analysis and the matching analysis also differ with regard to the modification relation between the relative clause and the relativized category (e.g. DP/NP)

that contains it. On the adjunction structure view (Chomsky 1977), relative clauses are treated as CPs adjoining to NP whereas in the complementation structure (Vergnaud 1974, Kayne 1994), relative clauses are complements of the determiner head of DP.

Traditionally, the matching analysis goes hand in hand with the adjunction structure whereas the promotion analysis with the complementation structure. However, these could be independent issues as Aoun and Li (2003) argue. For instance, they suggest that a language such as English can receive a complementation analysis but two types of relative clauses exist—one receives a promotion analysis and one a matching analysis. According to Aoun and Li, an adjunction structure in Chinese is preferred and similar to English, relative clauses receive both a matching analysis and a promotion analysis depending on the availability of reconstruction effects. I will however argue for a complementation structure in Chinese relativization, and the promotion analysis is hypothesized in the examples shown in this paper. In the next section, I will present my proposal.

2. The Proposal

Aoun and Li's (2003) argument for the adjunction analysis in Chinese relative clauses is based on the assumption that determiners are not available in Chinese; thus on their account, NP rather than DP movement is involved in Chinese relativization. In contrast to Aoun and Li's claim, I will argue for the complementation structure in analyzing Chinese relative clauses. This argument is built upon the availability of determiners in relative clauses: *de* is argued to be a pseudo-determiner that is non-referential and which lacks a definiteness value. Moreover, it is argued that DP movement, rather than NP movement is involved in relativization. My proposal is in line with Kayne's Antisymmetry of Syntax Theory (1994) according to which the head-initial structure and the leftward adjunction for relative clauses are universal across languages. However, theory aside, it is clear that Chinese is a head-initial language as discussed in the introduction, despite the fact that on the surface relative clauses differ from that

pattern. In this section, I will argue that *de* is a pseudo-determiner following Simpson (2002). It will be followed by a complementation analysis of Chinese relative clauses. Finally, I propose a derivation for Chinese relative clauses based on the availability of object scrambling in Chinese (Soh 1998) and the framework of Distributed Morphology (Halle and Marantz 1993).

2.1 The Status of *De*

The status of *de* in terms of its syntactic category is not unified in the literature. It is treated as a complementizer (Huang 1982; Cheng 1986) while others simply analyze it as a nominalizer that marks the modification relationship in NPs (Li & Thompson 1981). I will however argue that *de* is a pseudo-determiner following Simpson (2002).

De is usually not considered a determiner for the following reasons. Structurally, it occupies the position that is unusual for a determiner. In addition, *de* seems to lack of the properties of definiteness and referentiality that commonly come with determiners. In what follows, I will discuss these seemingly problematic properties of *de* as a determiner based on Simpson (2002). As discussed in Simpson (2002), if *de* is a determiner, there should be one single occurrence of determiner in the position of D^0 in one DP. In the relative clause in (4), we see two instances of *de*.

- (4) wo de zhu zai Beijing de hao pengyou.
 I DE live in Beijing DE good friend
 ‘my good friend who live in Beijing.’ (Simpson 2002, 264)

However, Simpson presents evidence from languages such as Hebrew and Greek, showing that it is not uncommon to have multi-determiners occurring within a single DP. The example is illustrated in (5).

- (5) ha-bayit ha-gadol. (Hebrew)
 the-house the-big
 ‘the big house.’ (Simpson 2002, 266)

Secondly, *de* lacks definiteness value, which is generally taken as an important feature of determiners. Again, Simpson pointed out that it is not necessarily the case in the following examples. In (some dialects of) German, for instance, the definite determiner is taken as an expletive place-holder element with names. It is the name that gives definiteness to DP, rather than the determiner itself (in Greek such determiners with proper names are obligatory in all dialects).

- (6) der Karl. (German)
 the Karl
 ‘Karl’ (Simpson 2002, 266)

In addition to the above structural facts showing the possibility that *de* is a determiner, it turns out that, diachronically, *de* is developed from a demonstrative element *zhi* in classical Chinese (Wu 2001). An illustration showing *zhi* as a demonstrative in classical Chinese cited from Wu (2001) is given in the following.

- (7) zhi er chong you he zhi.
 these two worm again what know
 ‘and what do these two worms know?’
 (Zhuangzi 1.10 / Wu 2001: 118)

In this paper, I wish to follow Simpson (2002), proposing that *de* is a pseudo-determiner that is non-referential and lacks definiteness. Having arrived at the analysis that determiners are available, I further propose that Chinese RCs receives a complementation structure that involves DP movement based on Kayne (1994). This is discussed in the next section.

2.2 The Complementation Structure

In Kayne’s (1994) complementation analysis, head-initial constructions and leftward adjunctions are universal across languages. The solution to languages such as English that have rightward adjunction in relative clauses is to assume

that the head noun is originated from the IP clause, and raised to the Spec CP. This CP is the complement of a determiner.

Simpson (2002) proposes similar steps in deriving relative clauses in Chinese based on the above analysis. The first step starts out from Kayne's (1994) hypothesis in which all languages have head-initial structures. The head noun is first raised from the IP clause to the Spec CP due to reconstruction effects. The next step is to move the whole IP to the SPEC DP: *de* behaves like an enclitic in languages like Romanian. Enclitics tend to attract some elements (e.g. IP in Chinese) for phonological support. However, Simpson's analysis raises a series of problems. First, under minimalist assumptions (Chomsky 1995, 2000), movement in the syntax must be triggered (an EPP feature on D could be postulated, but it would be *ad hoc*). Another problem is the fact that after the IP has raised to Spec-DP, the trace of the nominal is no longer c-commanded by its antecedent (this is a well-known problem for this type of analysis). Finally, it is more natural to think of the element *de* as the element that attaches to its host rather than the other way around. Being weak, *de* is the guest and it is the entity that goes to its host. In contrast to Simpson's proposal in which the whole IP is moved to the specifier DP, I propose a derivation that involves object scrambling of the head noun and a postsyntactic movement in which *de* is lowered to the position affixed to the IP. I will discuss these two movements respectively in the next two sections.

2.3 Object scrambling in Chinese

Following Kayne, I argue that Chinese RCs receive a complementation analysis rather than an adjunction analysis. However, in contrast to Kayne's leftward adjunction universal, I propose a rightward movement of the head noun based on the availability of object scrambling in Chinese (Soh 1998). I will summarize the issue of object scrambling based on Soh (1998) in the following and show the derivation of Chinese RCs in section 2.5.

The argument that object scrambling is available in Chinese is based on the observation that certain noun phrases can appear either before or after duration/frequency phrases (DFP, henceforth). Examples are illustrated in (8).

- (i) ?*all students >> two times (distributive reading)
 (ii) two times >> all students (group reading) (Soh 1998: 37)

Soh puts forward an interesting account of establishing the connection between the ordering of [V object DFP] and [V DFP object]. However, as a native speaker of Mandarin, it is difficult for me to obtain the distributive reading in (9) (the order of [V object DFP]). The unavailability of the distributive reading might result from the lexical property of *quanbu* (all). However, if one replaces ‘all’ with ‘every’, it seems that only distributive reading is available¹. This is different from Soh’s predictions in which two readings are available.

- | | OBJ | DFP | |
|------|---|-------------|--|
| (11) | wo qing-guo [mei-wei xuesheng] | [liang ci]. | |
| | I invited-PERF every-CL student | two time | |
| | ‘I have invited all students twice.’ | | |
| | (i) every student >> two times (distributive reading) | | |
| | (ii) ?*two times >> every student (group reading) | | |

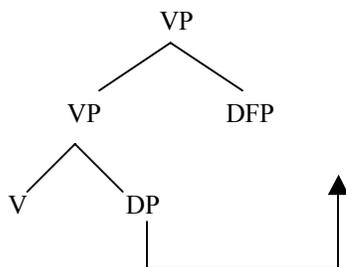
In the word order of [V DFP object], similarly, only the distributive reading is available when ‘all’ is replaced by ‘every’. This is again contrary to Soh’s argument in which only the group reading is available in this ordering.

- | | DFP | OBJ | |
|------|---|---------------------|--|
| (12) | wo qing-guo [liang ci] | [mei-wei xuesheng]. | |
| | I invited-PERF two time every-CL student | | |
| | ‘I have invited all students twice.’ | | |
| | (i) every student >> two times (distributive reading) | | |
| | (ii) ?*two times >> every student (group reading) | | |

¹ In fact, Chinese QP generally does not exhibit scope ambiguity. For instance, in the sentence ‘everyone likes someone’, only the subject QP can scope over the object QP.

Mei-ge-ren	dou	xihuan	yi-ge-ren
Every-CL-person	all	like	one-CL-person
‘For every <i>x</i> , there is a <i>y</i> , such that <i>x</i> likes <i>y</i> .’ (every > one; * one > every)			

In the following, I would like to explore another logical possibility that Soh suggests—rightward movement of object. The base order of this analysis is [V object DFP] and the order of [V DFP object] is derived by moving the object rightward. The following is the schema of this analysis.



This movement, according to Soh, predicts the following scope readings:

- (13) [V object DFP] → DFP > object
 [V DFP object] → (i) object > DFP; (ii) DFP > object

In the order of [V object DFP], the prediction is born out if ‘all’ (in Soh’s examples) is replaced by ‘every’. That is, only the distributive reading is available.

- | | | OBJ | | DFP | |
|------|---|------------|--|-------------|--|
| (14) | wo qing-guo [mei-wei xuesheng] | | | [liang ci]. | |
| | I invited-PERF every-CL student | | | two time | |
| | ‘I have invited all students twice.’ | | | | |
| | (i) every student >> two times (distributive reading) | | | | |

However, in the order of [V DFP object], only the distributive reading is possible.

- | | | DFP | | OBJ | |
|------|-------------------------|------------|---------------------|------------|--|
| (15) | wo qing-guo [liang ci] | | [mei-wei xuesheng]. | | |
| | I invited-PERF two time | | every-CL student | | |

‘I have invited all students twice.’

(i) every student >> two times (distributive reading)

(ii) ?*two times >> every student (group reading)

According to the above examples, the QP ‘every student’ has the wide scope over the DFP regardless the position it occupies (before or after the DFP).

[V object DFP] → object > DFP; [V DFP object] → object > DFP

Given this, I argue that the rightward movement of the object in the word order of [V DFP object] is compulsory because the object ‘every student’ does not reconstruct, i.e. it always has the wide scope over ‘two times’. Having argued that rightward movement is in fact possible in deriving the ordering of [V DFP object], I would like to further suggest that the head noun in the derivation of the relative clause also undergoes the same rightward movement. I will show in the next section that the first step in deriving a relative clause in Chinese also involves the same rightward movement of the head noun. The second step of the derivation involves Distributed Morphology, which I will discuss in Section 2.4.

2.4 Movement after Syntax: Distributed Morphology

I propose a postsyntactic movement in which *de* is lowered to the position affixed to the IP. This derivation is conducted within the framework of Distributed Morphology (Halle & Marantz 1993). I will summarize the relevant part to my proposal based on Embick and Noyer (2001) below.

It has been observed that certain lowering movement operations cannot be done at the level of syntax. For instance, in English, tense morphology appears on the main verb despite the fact that the main verb does not move to T(ense) in the syntactic derivation. According to the theory of Distributed Morphology (DM, henceforth), morphological movement operations such as *lowering* that cannot be explained by syntactic principles should in fact take place at PF. Embick and Noyer (2001) further suggest that there are at least two types of Merger depending on when it occurs. An important difference between

these two types of merger is their sensitivity to headedness and relations of adjacency between constituents. For instance, *Lowering* is sensitive to headedness. The elements that are involved in this operation do not have to be adjacent to each other (remember *Lowering* is performed hierarchically). In contrast, *Local Dislocation* must operate locally, e.g. it cannot skip adjoined elements. Moreover, this operation is not sensitive to phrasal categories. In other words, the moved element can merger with different categories. In the next section, I will show that *Local Dislocation* is the type of merger that is used in the derivation of Chinese RCs.

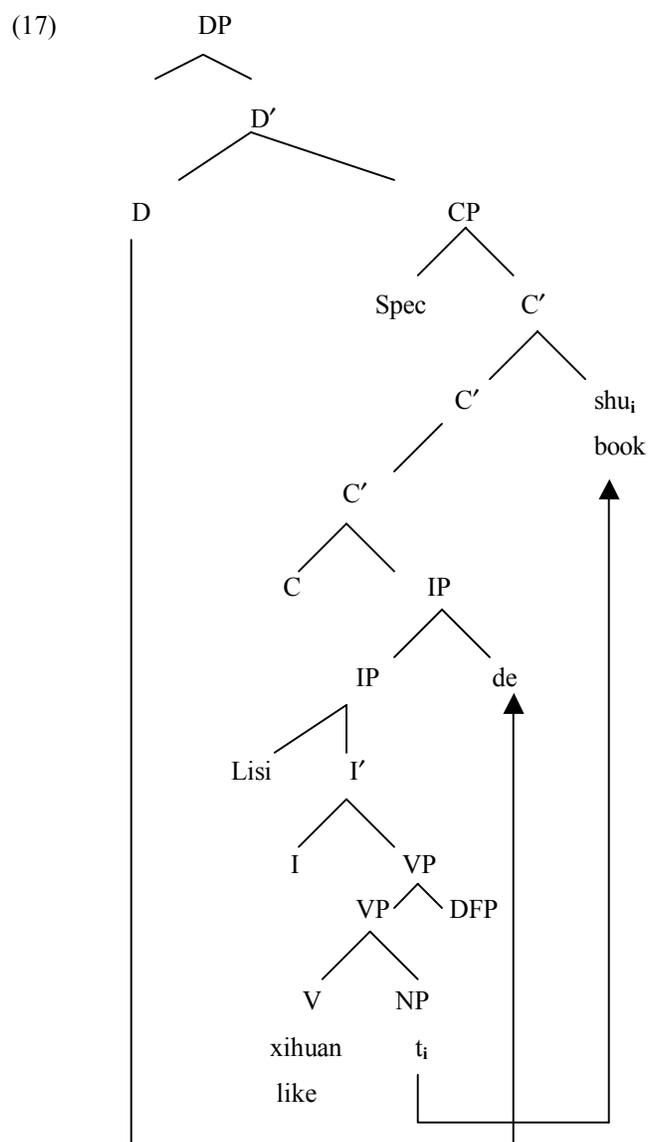
2.5 The Derivation of Chinese Relative Clauses at PF

I have shown that in Simpson's analysis, the IP raising has several theoretical problems. It seems that at this point, the only solution is to lower *de* to attach it to the IP. This is motivated by the fact that *de* is a weak element; therefore it should be moved to attach to its host. (16) is one of the examples where *de* is in need of an element before it: *de* never appears in first position.

- (16) IP: Lisi xihuan de shu.
 Lisi like DE book
 'the book that Lisi likes.'

However, the movement will create another serious problem for binding principles according to which, a trace must be c-commanded by its antecedent (the trace is followed by its antecedent). This problem can be solved if the lowering of *de* takes place *after* syntax, that is, at PF. Accordingly, I propose a post-syntactic derivation in Chinese relative clauses based on the theory of Distributed Morphology. This operation consists of two steps. The first step involves the rightward movement of the head noun, which I have mentioned in the previous section. Second, *Local Dislocation* of *de* is performed based on Morphological Merger according to which, the relation between D and IP can be expressed by the affixation of the lexical head of D to IP. *Local Dislocation*, rather than *Lowering* is performed because *de* can attach to different phrasal

categories. The head noun 'book' undergoes the rightward movement when *de* is lowered to attach to the IP. The movement at PF correctly predicts the surface word order of Chinese relative clauses. The derivation is shown in the following.



This two-step derivation correctly predicts the surface word order of relative clauses in Chinese.

Recall that in their adjunction analysis of Chinese relative clauses, Aoun and Li (2003) argue for a NP movement, rather than DP movement. Their evidence is from the behavior of reconstruction effects: what is reconstructed is NP in Chinese relativization. This is based on the observation according to which reconstruction effects only occur with respect to idioms, binding properties but not scope interpretations. I have argued that Chinese RCs should receive a complementation analysis, and that *de* is a determiner that lacks definiteness and referentiality. Accordingly, the DP it projects will be non-referential. This accounts for the differences between binding properties and scope interpretation with respect to reconstruction effects in Chinese relativization—the scope of the DP is fixed because the DP is not referential.

3. Conclusion

In this paper, I argued against Aoun and Li's adjunction analysis for Chinese relative clauses. It was shown that, on the one hand, the adjunction analysis creates the theoretically undesirable consequence that Chinese relative clauses are the only head-final phrase category in that language. On the other hand, the putative evidence that Aoun and Li put forward for the adjunction analysis is questionable. For instance, in terms of free ordering of modifiers, there is disagreement in the literature on the idea that relative clauses behave like adjectives syntactically.

I proposed instead a complementation analysis for Chinese relativization that can successfully account for the basic observation that Chinese is a head-initial language. The head-final word order effect in relative clauses is in fact triggered by the affixal nature of the determiner *de*. I further put forward the hypothesis that the derivation of Chinese relative clauses takes place at PF based on the Distributed Morphology framework. The movement operation at PF correctly predicts the surface word order of Chinese relative clauses. Finally, I showed that it is a non-referential DP that reconstructs in Chinese relativization. The differences between the binding properties and the scope interpretations can be accounted for by the fact that the scope of non-referential DP is fixed.

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